Dipartimento di Scienze Economiche e Metodi Quantitativi

Università degli studi del Piemonte Orientale Amedeo Avogadro

Quaderni SEMeQ

C. Aina

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Dipartimento di **S**cienze **E**conomiche e **Me**todi **Q**uantitativi
Via E. Perrone 18 – 28100 Novara
Tel. 39 (0) 321- 375310 Fax 39 (0) 321 - 375305
e-mail: segreteria.dsemeq@unipmn.it

The Determinants of Success and Failure of Italian University Students.
Evidence from administrative data

Carmen Aina
SEMeQ, Università del Piemonte Orientale, Italy

Abstract

We use unique administrative data from a large private Italian University to estimate whether individual characteristics before enrolment, academic performance, geographical mobility and family size may affect completion or not. Several outcomes are taken into account, namely probability of withdrawal both for voluntary or involuntary reasons, of graduating within the minimum period and with top marks. Our estimates highlight that all these dimensions drive the outcomes analysed. Especially poor high school backgrounds increases the chances of non-completion and graduation beyond the legal length. Higher final high school marks, more academic oriented diploma, living in a small family and being commuters entail a large probability of getting a degree with top marks and within the minimum period, as well.

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1. Introduction

This paper assesses the determinants of college students' behaviour, especially in terms of success and failure of the academic career using administrative data from Cattolica University. The Italian tertiary education system faces several problems: college drop-out and longer time to get a degree, to be more precise. Completion beyond the minimum period has a negative effect on individuals' starting salary (Brodaty, Bobo and Prieto, 2008). Moreover, in an era of great technological and economic changes, this tendency means that graduates might also experience more difficulties in finding a job - due to the mismatch between their acquired knowledge and skills demanded by firms - besides a delayed graduation reduces the number of an individual's years of peak earnings as she/he joins the labour market later than expected. Looking at the statistics for Italian graduates we note that on average only 16% out of the total amount of graduates has obtained a *Diploma di Laurea* within the legal length (Istat, 2001). Thus, according to the statistics drawn from "*Indagine sull'Inserimento Professionale dei Laureati dell'anno 1995*", carried out by Istat on a representative sample of Italian graduates, it appears that considering the whole tertiary education system, without making any distinctions amongst the faculties in which students are enrolled, the mean legal duration of a university programme was 4.39, the median effective duration in the same sample was 7 years and the mean was 7.41 and what's more, we note that the tendency to become *Fuori Corso* – as this category of graduates is defined - is widespread in every faculty.

Why is completion within the minimum period not very common in Italy? An explanation for such behaviour is related to institutional attributes of Italian universities, especially about the procedure for sitting exams:

- undergraduate students have at their disposal several dates during each academic year in which they may attempt an exam, besides, as a general rule, there are no constraints on the number of times an exam can be repeated. Clearly, this behaviour is in sharp contrast, for instance, to the UK rule, where all the exams scheduled for each academic year are concentrated at the end of it and enrolment in the next year is conditional on having passed all of them. On the one hand, this situation enhances the chances of passing an exam during each academic year - as students may sit it several times - on the other hand, it may act on the other way around – students might sit an exam also if they are not well prepared because they are aware of having additional possibilities;
- no restrictions to enrol at the academic years subsequent to the first one, so students can follow not a regular path to get a degree and in this manner increasing the chances of graduating not within the minimum period;

- students, even if they pass an exam, may refuse the mark achieved if they are not satisfied with it and take a resit of it, as a consequence this didactic organization can encourage the excess time to degree;

Hence, regarding the procedure of taking exams in Italian colleges, it is evident that the problem of lengthening time-to-degree is not only related to student sloth, feckless or individual's abilities, because also university's organisation – as mentioned above - encourages such behaviour.

Several studies show that other factors are related to degree completion (Johnes, 1990) For instance, recent researches have highlighted a negative relationship between parental education and time-to-degree, as it seems that whenever parents' education increases, the average time to get a degree decreases (Checchi, 2000, 2003; Checchi and Flabbi, 2005). Instead, top final grades at high school are associated with a shorter time to get a degree (Arulampalam, Naylor and Smith, 2003). Progression towards a degree is positively related to individual characteristics, parental background and family income (Checchi et al., 2001; Boero, Laureti and Naylor, 2005). Garibaldi et al. (2007), using administrative data of Bocconi University - a private leading university located in Milan - , show that a policy change, aimed at increasing the level of tuition fees during the expected final academic year, encourages the probability of graduating within the minimum period. The issue of elapsed-time-to-degree has been then analysed by Brunello and Winter-Ebmer (2003) using data drawn from a survey which was conducted at European level. These authors highlight that excess time to graduation is significantly higher in countries where the share of public expenditure for tertiary education on total expenditure is greater, furthermore they notice that students take longer to graduate in countries with a high rate of unemployment and stricter employment protection. As a consequence, the fact that entry into the labour market is not easy may discourage individuals from completing in time their studies. Moreover, the authors find that those who attend a private university are more likely to take longer to graduate than those who are enrolled in public colleges. A plausible explanation is that, contrary to the Italian situation, private universities across Europe are in general of lower quality than public ones, so they may attract students with lower abilities. Light and Strayer (2000) attempt to determine whether college quality and student ability have causal effects on university completion. The main conclusion they draw from their findings is that ability is an important, positive determinant of college success at large. In addition, they highlight that, at the lowest quality colleges - where the relatively low academic standards should facilitate progression toward a degree - graduation is mainly hampered by the

paucity of other high-ability students, financial aid, and other positive environmental factors, rather than other aspects.

Furthermore, several researchers have focused their attention also on graduate students' behaviour[1], as especially in the US it is common for more than half of the students who started a Ph.D. programme to leave without earning a doctorate, in addition, despite the fact that the legal length is equal to four years, only few students complete their studies within the minimum period required (Ehrenberg et al., 2005). Findings of these contributions to the elapsed time taken to earn a Ph.D are not relevant to our final goals, as we are aware of the fact that the characteristics of a student enrolled in a post-graduate course differs from those associated with an individual who attends an undergraduate degree programme, but the econometric approaches adopted are extremely useful for our analysis as in many studies they have applied survival analysis methods in sharp contrast with what has been done using Italian data.

In this piece of work we address several questions about the behaviour of university students:

- Do students' abilities really matter in terms of academic success?
- What are the major determinants affecting excess time to graduation and final grade?
- Are students who leave university before completion different from one another? And regarding graduate students?

Trying to answer these questions will be interesting in order to explain whether or not the level of preparedness of students has any effect on the probability of completion, and what other determinants may lead students to withdraw both for voluntary and involuntary reasons. Although the empirical evidence provided with this work is focused on administrative data from only one higher education institution, we are confident that this case study, along with the several ones already available for the Italian context, can enlarge the general knowledge of the determinants that affect the academic career of each student. In what follows, we simply limit ourselves to giving a broad picture of the factors that influence the probability of graduating, as well as with top marks and within the minimum period, and the likelihood of stopping studying or moving to another college.

The paper is organised as follows. The next section offers a description of the data. Section III discusses the econometric approaches and reports the corresponding results. Section IV concludes.

[1] See Ours and Ridder (2002), Ehrenberg and Mavros (1995), Ehrenberg et al. (2005), Stock and Siegfried (2000, 2006).

2. Data and variables

2.1 The Data

We use unique administrative data from Cattolica University from all the students enrolled in departments offering four year programmes between 1990/91 and 2000/01[2]. Cattolica is a large private Italian university which offers undergraduate and graduate degrees in various subject areas and in several centres, such as Milano, Piacenza and Brescia. Milan offers a wide choice of faculties, namely education, law, economics, modern literature and philosophy, language and linguistics, banking and finance, and political science. At Piacenza students may enrol in economics, law and education, instead at Brescia in modern literature and philosophy, language and linguistics and mathematics and physics.

We are conscious that, due to the private nature of this university along with the higher level of tuition fees applied[3], this college might attract students with specific personalities, tastes and abilities which may differ from the standards of Italian public universities, but as we control for several faculties we think that this analysis is nonetheless interesting since it represents a further attempt to investigate how students' characteristics may have consequences for academic career (see for instance Checchi, 2000; 2003; Boero et al., 2005 and Garibaldi et al., 2007).

The empirical work that follows is based upon the sample resulted from some restrictions, namely we exclude both students older than 30 years - as we focus our attention only to individuals who are, with greater probability, active in the academic life – and those who report missing value in the relevant information. The final sample is composed by 40,360 observations, whereof 30,630 graduates, 2,969 stopouts, 5,315 dropouts and 1,446 still enrolled.

The investigation can be divided into three parts, such as identification of the major determinants which affect academic success or failure, analysis of graduates' performance and elapsed time-to- degree.

2.2 Variables

2.2.1 Dependent Variables

About completion or non-completion of the academic career the outcome is based on: dropouts (*voluntary leavers*), stopouts (*involuntary leavers*), students who are still enrolled, and graduates, which are placed in the reference category.

Regarding students' performance only graduates are considered. We investigate the main determinants that influence either the final grade and the elapsed time-to-degree, and we define two dependent variables: *final grade* and *length*. The former is a discrete variable which

[2] For reasons of comparability, only students enrolled before the introduction of the "3+2" reform implemented in 2001 are considered in the present analysis.

[3] Tuition are determined according to the income tax declaration of the student's household.

represents the mark achieved by each graduate and it varies between 66 and 111[4], whereas the latter is a variable which indicates the number of years spent at university up to graduation and it varies from 0 to 8[5].

Finally, about the probability of getting a degree within the minimum period or not – we use the dummy variable *graduate*, which takes value 1 if a student graduates during the sample period and 0 when he/she is at risk of completion.

2.2.2 Explanatory Variables

The choice of the explanatory variables is informed by the received literature and based on the set of information available in the data. We may divide those variables into different categories as follows:

- **Personal characteristics:** gender
- **Students' abilities prior to university enrolment:** final high school grade, the type of institution attended and whether it was private or not. All these variables may enable us to analyse how much the level of knowledge achieved before college enrolment counts in terms of academic success;
- **Academic performance:** the data include follow-up information about the progress of each student. In particular we have the number of exams passed by each student, the average mark, the departments at which students are enrolled and the number of years spent at university. The data contain also the reasons of non-completion;
- **Family background:** family size that may enable to capture indirectly financial conditions of each student;
- **Demographic characteristics:** we calculate the distance between the departments attended and the hometown, in this way we can have a proxy of the mobility costs that those students have to face according to how far away they live from the faculty attended.

3. Empirical frameworks and results

3.1.1 Withdrawal from university: multinomial logit

The first issue analysed in this paper is related to the success or failure of academic experience. For this investigation we consider students who got a degree, those who withdrew from the university and those who are still enrolled over the sample period. In general, students at each point in time may decide to stay at university an additional year or not, hence they assign utility at each of these possible exits in order to decide whether or not to continue their studies, for

[4] In the Italian tertiary education system the minimum final grade is 66 and the maximum is 110 cum laude (conventionally codified as 111).

[5] Students who graduated within the legal length take the value 0, if they spent an additional academic year to get a degree the value is 1, and so on.

instance they graduate once the attached utility is greater than the utility associated with stopout exit, which in turn is higher than the one related to drop-out behaviour: $U_g > U_s > U_d$.

In our case we define as stopout those students who move to another university, instead dropouts are those who leave the whole tertiary education system. Given our interest in evaluating the magnitude of each determinant on the diverse exits resulted from the choices made by students over the period they are enrolled at university the *multinomial logit* model is estimated.

We model the following form specification:

$$O_i = \alpha + P_i\delta + A_i\beta + M_i\gamma + \varepsilon_i \quad i = 1,\ldots\ldots \text{N}$$

where O_i shows the reason why a student *i* exits from university. This takes value 1 if the student is graduate, 2 if the student is still enrolled, 3 if a person dropped out and 4 if the student moved to another university. According to Johnson (1994) making a distinction between the last two exits is important as the factors associated with dropping out behaviour appear to be very different to those associated with stopping-out. A_i contains information about students' abilities both prior to college enrolment and during the period they are enrolled. We introduce this set of variables as we want to detect the academic aptitude of each individual, since it has been more than established that academic performance has a significant positive influence on the likelihood that a student will successfully complete college, besides, as completion rates are also found to vary by subject areas, we include also the faculties in which an individual is enrolled in order to verify whether or not it may influence the type of exit . In addition, P_i refers to gender in order to capture differences in the determinants of attrition across students and family size. We include in the model also information on mobility (M_i) as we expect that those who live far away from their parental home are less likely to fail as, due to the limited mobility that characterises Italian college system, we suppose that students have better abilities and motivations as they have to support higher costs.

3.1.2 Graduates, dropouts and stopouts: results

Students' behaviour may be different according to each exits considered, namely still enrolled, graduates, dropouts and stopouts. In particular, graduates achieve their final purpose – getting a degree -, instead dropouts fail as they do not complete their course programmes and they quit studying, and stopouts withdraw from Cattolica University but they enrol in another college. Finally, those who are still enrolled might be at risk of experiencing all these exits.

The estimates shown in table 1 indicate first that both voluntary and involuntary non-completion are negatively related to the performance achieved prior to university entry.

[TABLE 1 AROUND HERE]

Especially those students who have attained a vocational diploma are more likely to drop out of university instead of graduating, and individuals who enrolled at university with a lower high school mark are more likely to withdraw, as well. On the contrary we notice that students with an academic oriented high school diploma face a greater probability of completion.

Interestingly, students who enter university having attended a private high-school show weaker abilities as they are more likely to drop-out from college than all the others. This finding supports the empirical evidence for Italy on this issue, as it has been established that students who attended private institutions prior to university enrolment have a weaker preparedness, especially those coming from lay high schools, as a result they have a greater probability of encountering difficulties which may induce those individuals to non-completion (Bertola and Checchi, 2001; Brunello and Rocco, 2008).

The results indicate that men are more likely to stop-out than women. This finding has been associated with more general gender differences regarding the determinants of the withdrawal problem. For instance, Tinto (1993) suggests that females leave university mainly because of social factors, while for males the major cause of quitting is related to their poor academic performance.

An important factor which has a direct negative effect on the probability of withdrawal is the average mark recorded at university, as overall low marks increase the likelihood of studies. This analysis shows that those who do not complete the academic career are in general individuals with lower abilities and weaker level of preparedness achieved prior to college enrolment, underlying that weaker students face more difficulties compared to those who had a stronger academic orientation during high-school.

As expected, attrition rates vary significantly also across subject areas, other things held constant. We observe that students reading law, political science and modern literature and philosophy are more likely to withdraw from university irrespective of the reasons, instead those who are enrolled at the faculty of banking and finance face lower probability of stopout. On the contrary, individuals enrolled at teaching and languages and linguistics are more likely to dropout. Finally, we notice that students coming from larger family are less likely to quit studies both for voluntary or in-voluntary reasons. This result may indirectly be related to the household financial conditions, as living in a family with more than four components might underlines poor financial resources, as a result once an individual enrolled at university it is because he/she has strong motivations and abilities, especially in a private university where tuition fees are higher. Within each of the categories taken into account in this framework we underline that the coefficients associated to the mobility, especially about those who moved to the town where the

university is placed, show larger probability of completion compared to those who already used to live in that town before enrolment.

3.2.1 Academic performance: graduation within the minimum period or with top marks?

The second issue analysed, using the graduate sample, is based upon the trade off that undergraduate students have to face: graduation within the minimum period or with top marks. The econometric model is estimated using the Zellner's seemingly unrelated regression estimator (SUREG), so we can estimate both the above aspects simultaneously while accounting for the correlated errors at the same time, leading to efficient estimates of the coefficients and standard errors.

Let O_i be a column vector containing *final grade* and *length*, and Z_i a vector about gender and family size. X_i is a set of students' abilities prior to university enrolment such as type of high school attended and its nature, high school final grade, type of faculty. Finally, information about students' mobility is included in vector Y_i. The regression error term is ε_i. The coefficients are the vectors α, β and γ

$$O_i = Z_i\alpha + X_i\beta + Y_i\gamma + \varepsilon_i \qquad i = 1, \ldots, N \qquad (1)$$

Moreover, since the independent variables are the same in the system, seemingly unrelated regression equations are equivalent to the OLS estimation, equation by equation. However, by estimating (1) as a system, there is a gain in efficiency since the disturbances in performance and speed equations are contemporaneously correlated. In other words, taking account of the correlation of the error terms across the equations lead to new estimates that are asymptotically more efficient than usual least squares estimates. Furthermore, the correlation matrix of residuals between the dependent variables – *final grade* and *length* - might be positive or negative. A negative correlation is expected if students adopt an efficient behaviour towards a degree achievement, whereupon individuals tend to follow a regular path to get a degree, meaning that they attend courses and immediately after they take the corresponding exams. Instead once the correlation of residuals is positive, it acts on the other way around.

3.2.2 University degree dilemma: results

In this section we investigate in depth the behaviour of graduates. We mainly focus our attention on the *Fuori Corso* issue. The lengthening of time-to-degree is in fact a big concern in Italy, and the major arguments presented to explain this phenomenon are related to the didactic organization of Italian higher institutions along with poor labour market conditions.

As mentioned above, we now study the major factors that influence even elapsed time-to-degree or final grade including all students who graduated over the sample period (table 2). From this

estimation we find that, as reported in table 3, the correlation matrix of residuals is negative (-.2539), meaning that the equations are related through a negative correlation in the errors, besides Breusch-Pagan test shows that the residuals from the two equations are independent (P=.0000).

[TABLE 2 AROUND HERE]

Regarding the final grade obtained by graduates, the estimates indicate that those who have achieved a better final high school mark are more likely to score higher final grade. Looking at the high school diploma, which is characterised by four types of upper secondary schools: academic oriented high schools (*Licei*)[6], teaching high schools (*Magistrali*), technical high schools (*Istituti Tecnici*) and vocational high schools (*Istituti Professionali*), we note that students who attended technical high schools and those who got lower high school marks are less likely to get a high final grade. Results highlight also that students who have attended private institutions before enrolling at college have lower probability of obtaining a higher final grade than their counterpart – graduates coming from a public high-school.

Regarding the gender, the probability of obtaining a higher final grade is greater for females than males, underlining once again that in general a female college student is a willing helper compared with males (McNabb, Pal and Sloane, 2001). Clearly, such behaviour is due to the existing gender differences, as mentioned above, female students are more devoted to studying than males and they want to make a good impression on families and friends, whereas male students prefer to complete their studies in less time, probably because of better job perspectives which lead them to pass more exams instead of making an effort to achieve a higher mark.

Furthermore, the best performance in terms of final grade is associated to students reading modern literature and philosophy, languages and linguistic, education and political science – they achieve higher final marks compared with all the other departments. This result is partly associated to the fact that at these departments there is a large fraction of females students.

Students, among the sample of graduates taken into account, who live far away from their parental home are more likely to complete university both with a lower mark and beyond the minimum period. These results may reflect the specific situation they face, since not living with their own family may charge students of more duties, such as taking care of the house, besides limited parents' supervision may induce those students to devote part of their time to non-academic activities which, reducing the time for studying, might favour especially lengthening time-to-degree.

[6] General schools can be classified according to the subject chosen: *Liceo Scientifico* (science), *Liceo classico* (modern literature), *Liceo Linguistico* (languages) and *Liceo Artistico* (art).

To sum up, we notice that in general better grades are mainly correlated to abilities and level of knowledge acquired before college enrolment, academic performance and the subject areas attended by students. Regarding elapsed time-to-degree, students who are enrolled at languages and linguistic and modern literature and philosophy are more likely to get the degree not within the minimum period required as probably the rate of return on degrees in these disciplines is low, so students may decide to complete college with a good mark and in more time rather than with a lower final grade in less academic years. In other words this behaviour reflects poor labour market opportunities associated to these faculties (Steel and Sausman, 1997). Having achieved very low high school marks facilitate completion in fewer years compared to the others, and we can only speculate on the reason for this as it may be due to the different taste of these people: they prefer completion in fewer years than a better final grade.

Students reading law are more likely to graduate not within the minimum period than those who are enrolled in the faculty of economics. Instead, those who are reading teaching, mathematics and physics, banking and finance or political science are more likely to finish their studies within the legal length.

3.3.1 Elapsed time-to-degree: duration model

In order to explain the elapsed time taken to earn a degree in one of the faculties of Cattolica University we use a duration model approach. We include in our sample only graduates and those students who are at risk of graduation, as a consequence we exclude from the sample all the individuals who have been enrolled less than four years, which is the legal length required for getting a degree. Individuals for whom we do not observe transition out of university – because they did not get a degree over the sample period - are right censored and, we assume that the process which gives rise to the censoring is independent of survival time.

To examine probability of completion a duration model is more appropriate as it may handle aspects like censoring, time varying covariates and it accounts for the differences in time in which each individual is at risk of experiencing the event.

In order to study college completion we use a complementary logistic model where the dependent variable takes value 1 when individuals graduate over the sample period and 0 when they are still enrolled at university. Prentice and Gloecker (1978) show that this model is the interval-censored discrete-time equivalent of a continuous-time model with the proportional hazards assumption. Interval censored means that although the actual transition process is discrete with smaller time units than observed in the data, the data are grouped into intervals - in our case time is measured in years. Proportional hazards means that the duration profile of the hazard is the same for everybody, with the explanatory variables shifting this profile upwards or

downwards. As a consequence, in order to make the interpretation of the regression results easier, we may transform the coefficients of this analysis into hazard ratios. The hazard ratio is so given by:

$$HR = \frac{\chi(x = a)}{\chi(x = a - 1)} = \exp(\beta\ )$$

where χ is the continuous time hazard rate. This is the relative risk associated with a one unit change in the value of the corresponding explanatory variable, holding everything else constant.

Clearly, we cannot suppose that all the individuals with the same vector of explanatory variables face the same expected hazard of getting a degree, so it is reasonable to assume that there are some students who are more or less likely than others to graduate due to unobservable factors. To model the unobserved heterogeneity, we use a complementary logistic model, where the frailty term is normally distributed.

Thus the hazard function for each risk is specified to be of the form:

$$h_{ij} = 1 - \exp(-\exp(\gamma_j(t) + \beta' X_i + \nu_i))$$

Where X_i is the set of explanatory variables, β' is the unknown parameter to be estimated, $\gamma_j(t)$ is the baseline hazard function, and ν_i is the frailty term normally distributed.

The explanatory variables included in the model are both time varying and fixed and, they intend to capture the effects of student ability, family size and students' mobility, as well as a vector of other control variables. The latter include whether a student is a female, the department and the site in which he/she is enrolled, the college average mark, the type of high school attended, the final grade and if private or not.

3.3.2 Graduation within the minimum period: results

The coefficients and hazard ratios of the probability of graduating within the minimum period on a complementary logistic model are shown in table 4 – which presents coefficients and hazard ratios.

[TABLE 4 AROUND HERE]

The logarithm of time spent at university before the achievement of a degree has positive and statistically significant effects on students' probability of getting a bachelor's degree. According to our sample it means that lengthening time-to-degree clearly increase the probability of graduating even if not within the minimum period, as longer time spent at university reduces the probability of withdrawal. The gender dummy reflects important sex differences in college behaviour. Specifically, female students are more likely to complete their studies within the minimum period than males, about 6% less. Several arguments have been presented to account

for that tendency, such as the fact that women are more devoted to studying, men might experience interruption of their studies because of the military service[7] along with greater opportunities of finding a job. Recent research highlights that gender differences in degree performance may arise for a number of reasons, such as the field of study chosen, the type and quality of the institutions attended as well as students specific attributes that are correlated with attainment (i.e. family background) (Johnes and McNabb, 2004).

The type of high-school attended prior to university has some important effects on completion as well. All the high-school dummies have negative and statistically significant effects on the dependent variable - probability of obtaining a degree within the minimum period - and their estimates have to be interpreted as differentials between those types of upper secondary school and the omitted category – *Licei*. These findings provide further evidence about the fact that the type of high-school attended appears to be strongly associated to academic success; having achieved either a technical or vocational diploma reduces the probability of college completion compared with student with professional diploma, by about 70% and 77%, respectively. These results are in line with the existing empirical evidence for Italy (see for instance Checchi, 2000; Bertola and Checchi 2001 and Cappellari, 2004). Furthermore, we have included in our regression also the nature of the high school, because our idea is to find out whether or not attending a private high-school pays in terms of educational output. According to the existence literature, we find that those who have achieved a secondary school diploma in a private institution have a lower probability of completion (about 33%). In fact in Italy, public high-schools are overall of high quality, especially compared with lay private schools. As a consequence, students' level of knowledge is rather elevated among those who have attended a public school. Unfortunately, in this work it has not been possible to make a further distinction between catholic private school and lay private school as such information was not available in the data. To support our result we may refer to the paper by Bertola and Checchi (2001) where the authors find that the best college performances are associated to public schools, followed by catholic private schools and lay private schools. Also Brunello and Rocco (2008), taking into consideration the tendency of enrolling in a private high school especially by weak students who are less likely to continue studying, and applying a theoretical model, confirm evidence on this topic. The empirical application of their model highlights for the Italian case that the majority of the preferences is given to the public high schools.

Another variable which is found to be relevant in getting a degree is the final grade obtained at high-school. The omitted category is composed of those students who have achieved a mark

[7] The military service was still mandatory for the cohorts taken into account.

above 90. As it is noticeable, there is a positive relationship between mark and graduation, since the lower is the final grade attained, the lower is the probability of college completion. In particular we find that the associated probabilities of completion within the minimum period are at each grade interval the following: about 55% (80-90), about 75% (70-79), and about 87% (60-69), which means, for example, that a student who has a mark within the interval mark 70-79 has 40% lower probability of getting a degree than those who have achieved a final grade greater than 90. As a matter of fact, this estimate stresses the importance of indicators related to students' abilities as attributes that influence their progression toward the university degree.

With regard to students' performance during the period they are attending college, we consider students' average marks and the faculty in which they are enrolled.

Looking at the average mark, we find that the probability of getting a degree within the minimum period is lower for those who have reported a poor performance, for instance those who have a very low average mark - equal to D-level – face about 94% lower chances of graduating within the minimum period than those who scored the highest average mark. According to empirical evidence, those results underline that the average mark is a relevant piece of information related to students' abilities along with students' progression. In fact, the data highlight that good marks increase the chances of getting a degree on time, but an average mark equal to A acts on the other way around, because having an average mark equal to the maximum grade implies that students perform in each exam at his/her best. The prior situation entails three scenarios: very high ability students who pass their exams easily and taking the maximum mark without making a considerable effort, students who devote more time in preparing an exam in order to get the maximum grade, and finally individuals who have refused some exams because the corresponding marks were not equal to the maximum mark, thereby reducing the speed, so it will take longer to complete university even if they are classified as students with higher abilities. Predictably, completion rates also vary significantly across subject areas, other conditions being equal. Estimates of all the faculties are statistically significant. Students enrolled in modern literature and philosophy, law, and languages and linguistic show lower chances of completion with respect to students enrolled in economics.

We now turn to the role played by family characteristics and by geographical origins of students. We find that living in a large family, composed of at least four individuals or even more, reduces the probability of completion within the minimum period. According to the literature review it has been well recognised that family size has negative effects on child achievement outcomes, because of a dilution of household financial resources available and reduction of parents' time. An interesting set of results is then related to the geographical origins

of students. Individuals who move from their hometown to the town of college are less likely to get a degree than those who already lived there, *ceteris paribus.* One might speculate that the relatively lower probability of completion for those students who live far from their parents may be the consequence of the difficulties that students may find to be confident about the new environment along with the major responsibilities they have to face living alone. This result is in line with the study of Card (1994), where he uses a simple indicator for the presence of a nearby college as an instrument for schooling. He finds that men who grow up near a 4-year college have significantly higher education and earnings than other individuals. Contrary to this finding, Johnes and McNabb (2004) show that those who choose to attend a local university in order to cut costs are more likely to drop-out. On the contrary, commuters are more likely to graduate within the minimum period than the stayers (about 16%).

4. Concluding remarks

We have provided evidence that completion rates, elapsed time-to-degree and withdrawal rates of undergraduate students enrolled at Cattolica University are all sensitive to both abilities prior to college enrolment and academic performance. We have mainly assessed whether or not individuals' abilities have a direct effect either in terms of success or failure.

About completion or non-completion issue, degree, dropouts, stopouts and students still enrolled are taken into account. We discover that both voluntary and involuntary non-completion are negatively related to performance prior to university entry. Especially those students who attended a private high-school are more likely to withdraw than all the others. Then results indicate, in line with the earlier studies, that men are more likely to either stop-out or drop-out than women. Moreover, individuals withdraw from college especially when they have a low level of preparedness. Regarding students who are still enrolled at college we note that it is more likely they are individuals with non-general high school diploma, poor academic results and living not in their hometown.

With regards to elapsed time-to-degree and graduation with top marks, we observe that students who have better pre-enrolment conditions, for instance academic oriented high school diploma and good marks, are more likely to get a degree with a higher final grade. On the contrary, students who come from private high school are less likely to achieve a high final mark, but they are more likely to complete their studies within the minimum period than those who attended a public high school. About gender differences, we notice that males are more likely to get a lower final grade than females. Overall those students who are reading modern literature and philosophy and languages and linguistic have a greater probability of getting a higher final grade, but not of graduating within the minimum period. This tendency might be related to the limited

job opportunities that these disciplines provide, so students might prefer to complete their studies with a better mark, even if it implies that they have to stay longer at university. Finally, we note that students who left their parental home face both higher probability of graduating beyond the legal length and with a lower final grade.

About probability of graduating with the minimum period, we find that the most important aspect is related to students' abilities. In particular, students who attended a more academic oriented high school, rather than other types of high-school (mainly professional one) and having obtained a better final mark are more likely to succeed. Completion rates also vary significantly across subject areas, other conditions being equal. Finally, another interesting result is related to geographical origins as it appears that students who left parental home are less likely to get a degree regarding those who still live in the same town where the university is located.

As a result, we conclude by saying that evidence provided here, even if it refers to one university, suggests that overall a student with a better curriculum in terms of high school attended, higher final grade achieved and whether is private or not increase the chances of graduating. Also good performance during the academic experience and better household conditions (indirectly controlled by family size) have a positive effect on completion. Poor pre-enrolment conditions are, on the contrary, responsible of the withdrawal behaviour. All these findings are in line with those obtained by Checchi (2000, 2003) and Boero et al. (2005) using administrative data coming from other Italian universities.

Further researches should aim at extending our knowledge of these issues, for instance considering also the role played by tuition fees on time spent at university and the role of peers on educational achievement. In this regard, a better understanding of additional factors that may influence college behaviour is definitely useful for devising new policies that can be implemented to improve the function of the tertiary system.

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Tables

Table 1 – Determinants that affect withdrawal from university using a multinomial logit approach

	Enrolled		Dropouts		Stopouts	
Variable	**Coeff.**		**Coeff.**		**Coeff.**	
Female	-.1141	*	-.1652	***	-.1871	***
High school track						
Technical	.3244	***	.7486	***	.0528	
Professional	.6997	***	1.302	***	.4631	***
Teaching	.4939	***	.6899	***	.1115	
Other	.6198	***	.7227	***	.4788	***
Private high school	.2076	***	.2435	***	.2302	***
High school leaving grade						
High school mark_80-89	.0151		.1364	***	.1513	**
High school mark_70-79	.3440	***	.5097	***	.4640	***
High school mark_60-69	.6286	***	.8930	***	.6387	***
Uni average mark_B	-.3405	***	-.0057		.0753	
Uni average mark_C	.0951		.5518	***	.3814	***
Uni average mark_D	1.422	***	2.386	***	2.315	***
Law	1.238	***	.7206	***	1.074	***
Modern Literature and Philosyphy	.9770	***	1.025	***	.6119	***
Languages and Linguistics	.1284		.6853	***	.1116	
Teaching	.3633	***	.5717	***	-.1127	
Banking and Finance	.3878	***	.0188		-.5768	***
Mathematics and Physics	-1.216		.0171		-.4862	***
Political Science	.5007	***	.5328	***	.3488	***
Brescia	.1193		.1227	***	.1884	***
Piacenza	-.0322		-.0544		-.7123	***
Commuters	-.0518		-.0391		.0939	*
Movers	.3069	***	-.2216	***	.5510	***
Family size: 3 or 4 components	.2328	*	-.6668	***	-1.004	***
Family size: more than 4 components	.1020		-.7042	***	-1.076	***
Constant	-4.319	***	-2.811	***	-2.597	***

*** and ** significant at 1 percent and 5 percent, respectively.
Reference category: male, *licei*, public high school, high school mark_90-100, economics, Milan, stayers, family with less than 3 components.

Table 2 Seemingly unrelated regression (SUREG) of final grade and speed among graduates

	College Final Grade		Elapsed Time to Degree	
Variable	**Coeff.**		**Coeff.**	
Female	.8444	***	-.0172	
High school track				
Technical	-2.646	***	.5644	***
Professional	-4.318	***	.9035	***
Teaching	-1.923	***	.5919	***
Other	-1.388	***	.1732	***
Private high school	-1.437	***	.1727	***
High school leaving grade				
High school mark_80-89	-2.663	***	.3811	***
High school mark_70-79	-5.279	***	.6493	***
High school mark_60-69	-7.973	***	.9578	***
Law	-1.482	***	.6109	***
Modern Literature and Philosyphy	8.199	***	.2826	***
Languages and Linguistics	6.921	***	.2540	***
Teaching	9.474	***	-.5154	***
Banking and Finance	-.2143		-.2363	***
Mathematics and Physics	.7029	*	-.3947	***
Political Science	4.445	***	-.2610	***
Brescia	.5982	***	-.1766	***
Piacenza	-.4697	***	-.6662	***
Commuters	.0024		-.0812	***
Movers	-.8915	***	.1165	***
Family size: 3 or 4 components	.1705		.0590	
Family size: more than 4 components	.2908		.0336	
Constant	13.390	***	1.314	***

*** and ** significant at 1 percent and 5 percent, respectively.
Reference category: male, *licei*, public high school, high school mark_90-100, economics, Milan, stayers, family with less than 3 components.

Table 3 Correlation Matrix of Residuals of SUREG regression

	Final Grade	**Length**
Final Grade	1.0000	
Length	-.2539	1.0000

Breusch-Pagan Test of Independence: $\chi^2 = 1973.934$ P-value=0.000

Table 4 – Probability of getting a degree within the minimum period

Variable	Coeff.	t	Haz.Ratios
Lndurata	.9894	***	2.690
Female	.0608	*	1.063
High school track			
Technical	1.202	***	.3006
Professional	-2.049	***	.1287
Teaching	-1.362	***	.2560
Other	-.4388	***	.6447
Private high school	-.3924	***	
High school leaving grade			
High school mark_80-89	-.8091	***	.4452
High school mark_70-79	-1.376	***	.2525
High school mark_60-69	-2.007	***	.1344
Uni average mark_B	.2359	***	1.267
Uni average mark_C	-.8124	***	.4437
Uni average mark_D	-2.782	***	.0619
Law	-1.730	***	.1772
Modern Literature and Philosyphy	-1.418	***	.2421
Languages and Linguistics	-.9680	***	.3798
Teaching	-.3878	***	1.473
Banking and Finance	-.3961	***	1.486
Mathematics and Physics	.8753	***	2.340
Political Science	-.1198		.8870
Brescia	.4239	***	1.528
Piacenza	1.402		4.065
Commuters	.1505	***	1.162
Movers	-.2275	***	.7965
Family size: 3 or 4 components	-.137	*	.8720
Family size: more than 4 components	-.061		.9410
Constant	-2.611	***	

*** and ** significant at 1 percent and 5 percent, respectively.
Reference category: male, *licei*, public high school, high school mark_90-100, economics, Milan, stayers, family with less than 3 components.